

WHAT IS CLAIMED IS:

1           1.     A two-stage actuator type magnetic head positioning  
2 mechanism comprising:

3                 a plurality of fine actuator sections which minutely drives,  
4 by a pair of piezo-electric elements mounted in said fine actuator  
5 sections, a magnetic head supporting section adapted to support  
6 a slider on which a magnetic head is attached;

7                 a plurality of holder arms to support each of said fine  
8 actuator sections;

9                 an arm block formed by integrally unifying said plurality  
10 of holder arms; and

11                a voice coil motor to drive said arm block;

12                whereby said fine actuator section is composed of an  
13 actuator spring made from one thin steel plate and a base plate  
14 made from one thick steel plate, both of which overlap each other,  
15 and wherein a driving spring section being connected to said  
16 magnetic head supporting section is mounted on said actuator  
17 spring and, in a vicinity of said driving spring section, a pair  
18 of driving voids to absorb vibration of said magnetic head  
19 supporting section and extension/shrinkage of said piezo-  
20 electric elements is formed in a state being symmetrical right  
21 and left with respect to a center axis of said actuator spring  
22 and wherein both end portions of said pair of piezo-electric  
23 elements are connected to said magnetic head supporting section  
24 and to said actuator spring in a manner that said end portions  
25 straddle each of said driving voids and wherein said base plate  
26 is junctioned to one face of said actuator spring in a manner that  
27 said base plate covers said pair of driving voids.

2. The two-stage actuator type magnetic head positioning mechanism according to Claim 1, wherein said base plate is opened at a place where said base plate and said magnetic head supporting section overlap each other and is junctioned to said actuator spring in a manner that said base plate surrounds external edges of said driving spring section of said actuator spring.

3. The two-stage actuator type magnetic head positioning mechanism according to Claim 1, wherein said driving spring section of said actuator spring is composed of a short plate spring and of a pair of side springs made from long plate springs and wherein said center spring is disposed on said center axis of said actuator spring while each of said side springs is disposed, with said center spring interposed between said side springs, in a direction being intersected almost at right angles to said center axis of said actuator spring and wherein said base plate is junctioned to said actuator spring, at least, at a root area of said center spring and said side springs.

4. The two-stage actuator type magnetic head positioning mechanism according to Claim 2, wherein said driving spring section of said actuator spring is composed of a short plate spring and of a pair of side springs made from long plate springs and wherein said center spring is disposed on said center axis of said actuator spring while each of said side springs is disposed, with said center spring interposed between said side springs, in a direction being intersected almost at right angles to said center axis of said actuator spring and wherein said base plate

10 is junctioned to said actuator spring, at least, at a root area  
11 of said center spring and said side springs.

1 5. The two-stage actuator type magnetic head  
2 positioning mechanism according to Claim 1, wherein said pair of  
3 driving voids to absorb vibration of said magnetic head supporting  
4 section and extension/shrinkage of said piezo-electric elements  
5 is formed at both sides of a mounting position of said magnetic  
6 head supporting section in said state being symmetrical right and  
7 left with respect to said center axis of said actuator spring and  
8 wherein each of said pair of piezo-electric elements is connected  
9 to said magnetic head supporting section and to said actuator  
10 spring in a manner that each of said piezo-electric elements  
11 straddles each of said driving voids along both sides of said  
12 mounting position of said magnetic head supporting section and  
13 said driving spring section is mounted between said actuator  
14 spring and said magnetic head supporting section.

1 6. The two-stage actuator type magnetic head  
2 positioning mechanism according to Claim 2, wherein said pair of  
3 driving voids to absorb vibration of said magnetic head supporting  
4 section and extension/shrinkage of said piezo-electric elements  
5 is formed at both sides of a mounting position of said magnetic  
6 head supporting section in said state being symmetrical right and  
7 left with respect to said center axis of said actuator spring and  
8 wherein each of said pair of piezo-electric elements is connected  
9 to said magnetic head supporting section and to said actuator  
10 spring in a manner that each of said piezo-electric elements  
11 straddles each of said driving voids along both sides of said

12 mounting position of said magnetic head supporting section and  
13 said driving spring section is mounted between said actuator  
14 spring and said magnetic head supporting section.

1 7. The two-stage actuator type magnetic head  
2 positioning mechanism according to Claim 5, wherein said driving  
3 spring section of said actuator spring is composed of said center  
4 spring made from one short plate spring and a pair of side springs  
5 made from long plate springs and wherein said center spring is  
6 connected to said magnetic head supporting section and to said  
7 actuator spring on said center axis of said actuator spring at  
8 an end portion of said magnetic head supporting section being  
9 nearer to said holder arm while each of said side springs is  
10 connected to said magnetic head supporting section and to said  
11 actuator spring in a manner that each of said side springs  
12 straddles each of said driving voids and in a manner that each  
13 of said side springs intersects almost at right angles to each  
14 of said piezo-electric elements.

1 8. The two-stage actuator type magnetic head  
2 positioning mechanism according to Claim 6, wherein said driving  
3 spring section of said actuator spring is composed of a center  
4 spring made from one short plate spring and a pair of side springs  
5 made from long plate springs and wherein said center spring is  
6 connected to said magnetic head supporting section and to said  
7 actuator spring on said center axis of said actuator spring at  
8 an end portion of said magnetic head supporting section being  
9 nearer to said holder arm while each of said side springs is  
10 connected to said magnetic head supporting section and to said

11 actuator spring in a manner that each of said side springs  
12 straddles each of said driving voids and in a manner that each  
13 of said side springs intersects almost at right angles to each  
14 of said piezo-electric elements.

9. The two-stage actuator type magnetic head  
positioning mechanism according to Claim 5, wherein a part of said  
base plate on which said magnetic supporting section is laid is  
separated from a main portion of said base plate in a state in  
which the separated part of said base plate is nested in said main  
portion of said base plate and is junctioned to said magnetic head  
supporting section and a pair of second driving voids being laid  
on said pair of driving voids so that said pair of second driving  
voids and said pair of driving voids overlap each other are formed  
between said portion of said base plate separated to be nested  
in said main portion of said base plate and said main portion of  
said base plate and wherein both end portions of each of said pair  
of piezo-electric elements are connected to said magnetic head  
supporting section and to said actuator spring through said  
portion of said base plate separated to be nested in said main  
portion of said base plate and said main portion of said base plate  
in a manner that each of said piezo-electric elements straddles  
each of said second driving voids.

10. The two-stage actuator type magnetic head  
positioning mechanism according to Claim 6, wherein a part of said  
base plate on which said magnetic supporting section is laid is  
separated from a main portion of said base plate in a state in  
which the separated part of said base plate is nested in said main

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1 13. The two-stage actuator type magnetic head

2 positioning mechanism according to of Claim 5, wherein length of  
3 said actuator spring is set so as to end at a tip of said holder  
4 arm so that said actuator spring being junctioned to said base  
5 plate and said holder arm do not overlap each other when said base  
6 plate is connected to said holder arm.

1 14. The two-stage actuator type magnetic head  
2 positioning mechanism according to Claim 6, wherein length of said  
3 actuator spring is set so as to end at a tip of said holder arm  
4 so that said actuator spring being junctioned to said base plate  
5 and said holder arm do not overlap each other when said base plate  
6 is connected to said holder arm.

1 15. The two-stage actuator type magnetic head  
2 positioning mechanism according to Claim 1, wherein a boss section  
3 is formed on said base plate so that said base plate is connected  
4 to said holder arm.

1 16. The two-stage actuator type magnetic head  
2 positioning mechanism according to Claim 2, wherein a boss section  
3 is formed on said base plate so that said base plate is connected  
4 to said holder arm.